

REMARKS

The Office Action of October 23, 2000, Paper No. 8, and the prior art relied upon therein have been carefully reviewed. The claims in the application are now claims 1-4, 7 and 21-30, and these claims define patentable subject matter warranting their allowance. Applicants accordingly respectfully request favorable reconsideration and allowance.

Acknowledgement by the PTO of the receipt of applicants' papers filed under Section 119 is noted.

Claims 1-20 have been rejected under the second paragraph of Section 112. The rejection is respectfully traversed.

The rejection states that the claims are generally narrative and indefinite, failing to conform with current U.S. practice. Even if the claims were generally narrative and failing to conform with U.S. practice, this would not make them indefinite and would not subject them to rejection under the second paragraph of Section 112. Applicants believe that the claims as previously drafted, considered in light of applicants' specification (fully consistent with the law), would not have been confusing to those skilled in the art, and therefore the claims in their previous form are fully in accordance with Section 112. At **worst**, the claims in their

previous form might be considered objectionable, but **only** as to form.

Nevertheless, in deference to the examiner's views, and to avoid needless argument, a number of cosmetic amendments have been made in the claims. Such amendments are of a formal nature only, i.e. made to place the claims in better form consistent with U.S. practice. The amendments are not "narrowing" amendments because the scope of the claims has not been reduced. No limitations have been added and none are intended; the meaning of the claims remain the same, although the all the points raised in the rejection have been addressed by the amendments presented above.

As regards a "reduced" coefficient of thermal expansion, it is clear from applicants' specification that it is "reduced" compared to what is achieved in the prior art.

Applicants respectfully request withdrawal of the rejection.

Prior to addressing the rejection based on prior art, applicants believe it would be helpful to review the present invention. Thus, the present invention involves controlling thermal expansion in a laminate by selecting components of the laminate so that such components tend to balance one another with respect to their respective linear thermal expansion coefficients. This may be done in a variety

of ways, including providing different **layers** of the laminate with different thermal expansion coefficients, by balancing the thermal expansion coefficient of the reinforcement fibers with that of the resin, by the selection of different reinforcing fibers, and/or by the arrangement of such fibers (e.g. how they are twisted and/or the directions in which they are laid down, e.g. triaxially as shown in Fig. 3c and 4c).

In particular, the present invention desirably uses a combination by which the coefficient of thermal expansion is counterbalanced to assume a coefficient of thermal expansion of the entire composite material to be zero by a balance between the reinforcing fibers and the matrix resin. Thus, the linear thermal expansion coefficient of the reinforcing fibers can all be negative, in which case such a negative coefficient of thermal expansion of the reinforcing fibers is counterbalanced by a positive coefficient of thermal expansion of the matrix resin. The present invention is also aimed at increasing the choices of reinforcing fibers.¹

In place of the cancelled claims, applicants have added a number of new claims above. It is believed that support is clear from applicants' specification; briefly,

¹ For example, a reinforcing fiber with a negative coefficient of linear expansion can be combined according to the present invention with a reinforcing fiber which does not necessarily have a negative coefficient of linear expansion, or with one having a different coefficient of linear expansion which otherwise could not be used.

however, support is found at page 6, lines 6-23; page 7, lines 1-5 of the penultimate paragraph; the table at the top of page 10; page 11, first sentence of the second paragraph; page 15, second paragraph after the table.

The newly added claims are patentable for the same reasons as the other claims, as pointed out below.

Claims 1-20 have been rejected under Section 102 as anticipated by Miyadera et al USP 4,446,191 ("Miyadera").

This rejection is respectfully traversed.

While at first review it may appear that Miyadera is close prior art, in fact the present invention differs significantly from Miyadera. Thus, Miyadera describes a composite laminate wherein the fibers are not only required to be a mixture of aromatic polyamide fibers (Aramid) and glass fibers, but even the respective quantities are specified noting, for example, column 1, lines 41-44, and lines 54-56.

Miyadera then states:

When the content of aromatic polyamide fiber is less than 30% (the content of glass fiber is more than 70%), **the resultant laminate is unsatisfactory** with respect to linear expansion coefficient, and when the content of aromatic polyamide fiber is more than 95% (the content of glass fiber is less than 5%), the resultant laminate exhibits an inferior interlaminar strength. (emphasis added)

Miyadera does not disclose (or even make obvious) any of (1) the use of applicants' fibers, or (2) the concept of providing counterbalance by varying the thermal expansion coefficients of different layers of the laminate, or (3) balancing coefficients of expansion of the resin as opposed to the reinforcing fibers, or (4) the use of triaxial orientation of the fibers.

Miyadera does not anticipate applicants' claims. The rejection under Section 102 should be withdrawn, and such is respectfully requested.

No rejection has been imposed under Section 103. Applicants agree that applicants' claims are not made obvious by any known prior art.

Applicants respectfully request favorable reconsideration and allowance.

Respectfully submitted,

BROWDY AND NEIMARK, P.L.L.C.
Attorneys for Applicant(s)

By



Sheridan Neimark
Registration No. 20,520

SN:jec
Telephone No.: (202) 628-5197
Facsimile No.: (202) 737-3528
G:\BN\O\Ohta\Kubomura 1\PTO\AMD24Mar03.doc